

REMARKS

Applicant has carefully reviewed and considered the Office Action mailed on February 24, 2003, and the references cited therewith.

Claims 1-3, 6-7 and 22 are amended, and claims 25-35 are added; as a result, claims 1-3, 5-9 and 22-35 are now pending in this application.

The amendments made herein have been to clarify the claims and are not intended to limit the scope of equivalents to which any claim element may be entitled. The amendments to claims 6-7 are also made to provide proper antecedent basis for the term, "convection medium." The amendments to the claims and new claims have support throughout the specification, including in the figures. No new matter has been added as a result. Applicant respectfully requests reconsideration of the above-identified application in view of the amendments above and the remarks that follow.

§103 Rejection of the Claims

Claims 1-2, 5-9 and 22-24

Claims 1-2, 5-9 and 22-24 were rejected under 35 USC § 103(a) as being unpatentable over Jean (U.S. 5,701,951) or Morosas (U.S. 5,494,058) in view of Lee (U.S. 4,375,655) and Yeh (U.S. 5,706,169).

The Examiner states that Jean (Figs. 3-6) and Morosas (Figs. 1-5) disclose all the claimed features with the exception of the folded fin having semi-circular arches and a clip and that Lee discloses that it is known to have a folded fin having semi-circular arches for the purpose of reducing pressure losses within the fluid flowing over the arches. The Examiner concludes that it would have been obvious to employ in Jean or Morosas semi-circular arches to reduce pressure losses and to employ the claimed materials. The Examiner further states that Yeh (Fig. 2) discloses that it is known to have a clip that couples to a base to provide a connection and that it would have been obvious to employ such a clip in Jean or Morosas.

Applicant respectfully submits that the Examiner has not established the *prima facie* obviousness of the present claims. To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the cited references themselves or in the knowledge generally available to an art worker, to modify the

reference or to combine reference teachings so as to arrive at the claimed invention. Second, the art must provide a reasonable expectation of success. Finally, the prior art reference must teach or suggest all the claim limitations. In re Ochiai, 37 USPQ2d 1127 (Fed. Cir. 1997) (When evaluating the scope of a claim, every limitation in the claim must be considered).

Applicant further notes that claims 2 and 5-9 are dependent on claim 1 and claims 23-24 are dependent on claim 22. The additional limitations provided in dependent claims 2, 5-9 and 23-24 cannot by themselves be rendered obvious over the cited references if the independent claim from which it depends is determined to be nonobvious.

Neither Jean nor Morosas teach or suggest the claimed invention. Jean discusses a heat dissipation device having a corrugated porous heat dissipating plate fixed on the upper surface of a base plate to transfer heat from the base plate to the heat dissipating plate. The heat dissipating plate consists of several generally V-shaped sections. (See col. 2, lines 40-43). Morosas discusses a plurality of spaced cooling fins required to be fixed not only to a base, but also to a top wall of a housing that has an aperture aligned with an outlet opening of the fan assembly. Airflow from the fan assembly extends from the opening in the top wall of the housing and out through both end openings of the housing. And, as the Examiner admits, neither Jean nor Morosas discuss a folded fin having semi-circular arches nor a clip.

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In contrast, claim 1, as amended, recites a heat sink, comprising a plurality of laterally placed planar fins forming from a sheet, the plurality of laterally placed planar fins defining a folded fin structure having a top, a bottom, and a front, each fin having an aspect ratio of between about 20:1 and 30:1, wherein the top of at least one fin of the folded fin structure comprises an arch, further wherein the top of the at least one fin includes a trimmed opening that extends along a portion of the length of the top of the at least one fin, the trimmed opening formed by removing the arch along the portion of the length of the top of the at least one fin; a base attached to the bottom of the folded fin structure; and at least two clips to attach and thermally couple the folded fin structure to the base, the at least two clips not in contact with the top of the folded fin structure when in place. Additionally, claim 22, as amended, recites a heat sink, comprising a thermally conductive sheet creased in an accordion fold to form a plurality of surfaces defining a fin bundle having a top and a bottom, each fin having an aspect ratio of between about 20:1 and 30:1, wherein the top of the fin bundle is modified to create a plurality

of trimmed openings that extend along a portion of the length of the top of the fin bundle, wherein the top of the fin bundle comprises a plurality of arches, and the trimmed openings are formed by removing the plurality of arches along the portion of the length of the top, wherein more than fifty percent of the plurality of surfaces are receptive to an introduced convection medium; a fan for introducing the convection medium, the fan attached to the top of the fin bundle; a base attached to the bottom of the fin bundle; and a clip to attach and thermally couple the base to the bottom of the fin bundle, the clip not in contact with the top of the fin bundle when in place.

Neither Lee nor Yeh overcome the deficiencies of the primary references. Lee discusses a heat sink apparatus that utilizes either natural or forced convection to transfer heat. The fin elements can take on a variety of configurations, including V- or saw tooth-shaped, segmented in design (i.e., modified conventional fin shown in FIG. 4), and the like. Applicant could find no discussion in Lee of any embodiments that included providing openings in the fin elements. Rather, the focus in Lee appears to be on boundary layer fluid flow patterns (Col. 3, lines 32-33 and col. 6, lines 53-65). In many embodiments there is also a cover plate on top of the fin bundle. Yeh discusses a CPU cooling apparatus comprising a rectangular cooling plate and two corrugated cooling fins. In one embodiment, Yeh discusses a single fastening "frame" having two vertical arms and a horizontal arm. The horizontal arm of the single fastening frame is necessarily in contact with the top of the cooling fin as shown in FIGS. 1 and 2. (See also col. 3, lines 17-30).

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In contrast, claim 1, as amended, recites that the top of the at least one fin includes a trimmed opening that extends along a portion of the length of the top of the at least one fin and further recites at least two clips to attach and thermally couple the folded fin structure to the base, the at least two clips not in contact with the top of the folded fin structure when in place. Additionally, claim 22, as amended, recites that the top of the fin bundle is modified to create a plurality of trimmed openings that extend along a portion of the length of the top of the fin bundle, and further recites a clip not in contact with the top of the fin bundle when in place.

At a minimum, the products in the primary references and the products in the secondary references are all fundamentally different from each other and such critical differences must be

recognized. In re Bond, 910 F.2d 831, 834, 15 USPQ2d 1566, 1568 (Fed. Cir. 1990), *reh'g denied*, 1990 U.S. App. LEXIS 19971 (Fed. Cir.1990).

Furthermore, there is no suggestion in either Jean or Morosas *as to the desirability* of having either semi-circular arches or a clip nor is there any indication in either Jean or Morosas of any appreciation of the problem being solved by Applicant's invention. Given the fundamental differences in each of the references, it is also not clear that such modifications would be successful, but the mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification. Additionally, motivation to combine the references must come from within the references themselves and cannot be generated by "hindsight or reconstruction." In this instance, there is simply no suggestion or motivation, either in the cited references themselves or in the knowledge generally available to an art worker, to combine the reference teachings as suggested. Uniroyal Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 5 USPQ2d 1434 (Fed. Cir.1988). Applicant requests the Examiner to either provide evidence of such motivation or withdraw this rejection. See also In re Sang Su Lee, No. 00-1158 (Serial No. 07/631,240), (Fed. Cir.), decided January 18, 2002 (attached hereto).

Applicant further notes that focusing on the obviousness of substitutions and differences instead of on the invention as a whole is a legally improper way to simplify the difficult determination of obviousness. Hybritech Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1367, 231 USPQ 81, 93 (Fed. Cir.1986).

In any case, the suggested combination does not teach each and every element of Applicant's claims.

Applicant is the first to provide a heat sink having the elements as recited in claims 1 and 22, as amended.

The references neither independently, or combined, contain each and every element of Applicant's claimed invention. Applicant respectfully submits that independent claim 1, and claims 2-3 and 5-9, which depend from claim 1, as well as independent claim 22, and claims 23-24, which depend from claim 22, are patentably distinct from the cited references, either alone or in combination. Claims 1-3, 5-9 and 22-24, as amended, each viewed as a whole, are not

suggested by the cited references and not obvious under 35 USC § 103(a). Reconsideration and withdrawal of this rejection is respectfully requested.

Claim 3

Claim 3 was rejected under 35 USC § 103(a) as being unpatentable over Jean or Morosas in view of Lee and Yeh as applied to claims 1-2, and further in view of Bishop et al. (U.S. 5,576,932). The Applicant respectfully traverses this rejection.

The Examiner states that Bishop in Figure 1 discloses that it is known to have both first and second fans for the purpose of enhancing convective heat transfer and that it would have been obvious to employ in Jean or Morosas a second fan.

Applicant again respectfully submits that the Examiner has not established the *prima facie* obviousness of the present claims.

Furthermore, claim 3 is a dependent claim. The additional limitations provided in dependent claim 3 cannot by themselves be rendered obvious over the cited references if the independent claim from which it depends is determined to be nonobvious.

As discussed above, neither Jean nor Morosas teach or suggest the claimed invention for all the reasons stated above. Additionally, neither Ley nor Yeh overcomes these deficiencies for all the reasons stated above. Applicant also notes that Morosas appears to teach away from the use of multiple fans given the comments contained in the Background regarding the problems with the use of multiple fans with a general forced convection system (col. 1, lines 23-27). Even if this is not found to be the case, there is no teaching or suggestion in either Jean or Morosas as to the desirability of using more than one fan.

Bishop also does not overcome the deficiencies of the primary or secondary references. Bishop discusses a method and apparatus for cooling a heat source using a base that includes flanges referred to as "rectangular-shaped fins," such flanges in contact on their top surfaces with a plate 16 having openings 28. (See col. 4, lines 8-16). As with Lee, Applicant can not find any discussion in Bishop of any embodiments that included providing openings in the fins.

Again, the products in the primary references and the products in the secondary reference are fundamentally all different from one other. Additionally, the product in Bishop is different

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from each of the products in the primary and secondary references for all the reasons noted above and such critical differences must be recognized. In re Bond, supra.

However, as noted above, Bishop does share a unique feature in common with Lee, namely, the absence of any openings in the fins, which demonstrates a lack of appreciation of the inherent benefit provided by such openings (i.e., increased surface area for cooling). Such a fin structure teaches away from the claimed invention. Applicant notes that while a court must ascertain the differences between a claimed invention and the prior art, it is not proper to focus on the question of whether any particular difference or differences would have been obvious. Rather, 35 USC 103 requires that the invention be considered "as a whole." Furthermore, a prior art reference must be considered in its entirety, including portions that teach away from the claimed invention. The fact that a reference teaches away from a claimed invention is highly probative that the reference would not have rendered the claimed invention obvious to one of ordinary skill in the art. Stranco Inc. v. Atlantes Chemical Systems, Inc., 15 USPQ2d 1704, 1713 (Tex. 1990).

Again, the prior art must provide a motivation or reason for the worker in the art, *without the benefit of the Applicant's specification*, to make the necessary changes in the reference device. Ex parte Chicago Rawhide Manufacturing Co., 226 USPQ 438 (PTO Bd. App. 1984). In this instance, there is simply no suggestion in either Jean or Morasas *as to the desirability* of providing a second fan. There is further no indication of any appreciation of the problem being solved by Applicant's invention. Applicant again requests the Examiner to either provide evidence of such motivation or withdraw this rejection. In re Sang Su Lee, supra.

In any case, the suggested combination does not teach each and every element of Applicant's claims.

Furthermore, Applicant is not claiming to be the first to provide more than one fan to improve heat dissipation. Applicant is the first, however, to provide a heat sink, comprising a plurality of laterally placed planar fins forming from a sheet, the plurality of laterally placed planar fins defining a folded fin structure having a top, a bottom, and a front, each fin having an aspect ratio of between about 20:1 and 30:1 wherein the top of at least one fin of the folded fin structure comprises an arch, further wherein the top of the at least one fin includes a trimmed opening that extends along a portion of the length of the top of the at least one fin, the trimmed

opening formed by removing the arch along the portion of the length of the top of the at least one fin; a base attached to the bottom of the folded fin structure; and at least two clips to attach and thermally couple the folded fin structure to the base, the at least two clips not in contact with the top of the folded fin structure when in place, as recited in claim 1, as amended, in combination with a fan attached to the folded fin structure to introduce a convection medium, as recited in claim 2, as amended, wherein the fan is a first fan attached to the top of the folded fin structure, in combination with a second fan attached to the front of the folded fin structure to introduce a convection medium in a direction different from the first fan, as recited in claim 3, as amended.

The references neither independently, or combined, contain each and every element of Applicant's claimed invention. Applicant respectfully submits that independent claim 1 and claim 3 (as well as claim 2), are patentably distinct from the cited references, either alone or in combination. Claim 3, viewed as a whole, is not suggested by the cited references and not obvious under 35 USC § 103(a). Reconsideration and withdrawal of this rejection is respectfully requested.

CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney at 612-349-9592 or Barbara Clark at 515-233-3865 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Box AF, Commissioner of Patents, Washington, D.C. 20231, on this 24 day of April, 2003

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